

cells, comprising introducing a DNA fragment or a plasmid containing the DNA fragment into plants or plant cells or algal cells, wherein said DNA fragment is expressed and has the following characteristics:

(1) said DNA fragment encodes a part of a protein, wherein said protein has protoporphyrinogen oxidase activity in plants;

E' (2) said DNA fragment has a sequence that can be detected and isolated by DNA-DNA or DNA-RNA hybridization to a nucleic acid sequence that is complementary to a nucleotide sequence encoding an amino acid sequence of SEQ ID NO:1, wherein said DNA-DNA or DNA-RNA hybridization occurs under 2X PIPES buffer, 50% deionized formamide, 0.5% (w/v) SDS, 500µg/ml denatured sonicated salmon sperm DNA at 42°C overnight; and said DNA fragment remains hybridized after washing in 2X SSC, 1% (w/v) SDS; temp. of wash?

(3) said DNA fragment encodes the part of the protein in which an amino acid corresponding to Val13 of SEQ ID NO:1, is substituted by another amino acid; and

(4) said DNA fragment has an ability to confer resistance to protoporphyrinogen oxidase-inhibiting herbicides in plant or algal cells when expressed therein.

E² 6. (Twice Amended) The method according to claim 1, wherein said protein has protoporphyrinogen oxidase activity in *Chlamydomonas*.

5² 7. (Amended) The method according to any one of claims 1, 2, 4 or 6, wherein Val13 or the corresponding amino acid is replaced by methionine.

15. (Twice Amended) An isolated DNA fragment which has the following characteristics:

(1) said DNA fragment encodes a part of a protein, wherein said protein has protoporphyrinogen oxidase activity in plants;

5³ (2) said DNA fragment has a sequence that can be detected and isolated by DNA-DNA or DNA-RNA hybridization to a nucleic acid sequence that is complementary to a nucleotide sequence encoding an amino acid sequence of SEQ ID NO:1, wherein said DNA-DNA or DNA-RNA hybridization occurs under 2X PIPES buffer, 50% deionized formamide, 0.5% (w/v) SDS, 500µg/ml denatured sonicated salmon sperm DNA at 42°C overnight; and said DNA fragment or its complement remains hybridized after washing in 2X SSC, 1% (w/v) SDS;

(3) said DNA fragment encodes the part of said protein in which an amino acid corresponding to Val13 of SEQ ID NO:1 is substituted by another amino acid; and

(4) said DNA fragment has an ability to confer resistance to protoporphyrinogen oxidase-inhibiting herbicides in plant or algal cells when expressed therein.

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21. (Twice Amended) The isolated DNA fragment according to any of claims 15, 16, 18 and 20, wherein said another amino acid is methionine.